VOL'KENSHTEYN, M.V.

Stereoisomerism in polyesters and polyamides. [illegible] S. [illegible] and M. V. Vol'kenshtein (High Polymer Inst., Leningrad). [illegible] Khim. Nauk 1957, [illegible]. cf. Natta and Corradini, [illegible] 49, 13730d. — Oxidation of crude pulegone with $KMnO_4$ at 30–6° gave d-$HO_2CCH_2CHMe(CH_2)_2CO_2H$, [illegible] m. 85.5–6°, $[\alpha]$ 8.9°. Oxidation of mixed isomers of methyl-cyclohexanol with 50% HNO_3 at 55–60° gave a dl-mixt., m. 93–4°, [illegible]. Reduction of di-Et esters of these prepns. over Cu chromite catalyst with H gave d and dl-3-methyl-1,6-hexanediol, [illegible] had [illegible] 3° and gave a bis(p-nitrobenzoate) [illegible] while that of the dl-form m. 97.5–8.5°. The pairs of the diol and the acid taken in all permutations were converted to polyesters by heating in vacuo in the presence of p-$MeC_6H_4SO_3H$ and a small amt. of xylene 15 hrs. at 150 [illegible] finally in [illegible]. The polyesters thus formed were compared as to glass temp. [illegible]

[illegible] temp. of d p[illegible]

VOL'KENSHTEYN, M.V.

AUTHOR: Vol'kenshteyn, M. V., Doctor of Physico-Mathematical Sciences 30-11-22/23

TITLE: An International Symposium on the Hydrogen Bond in Ljubljana (Mezhdunarodnyy simpozium po vodorodnoy svyazi v Lyublyane)

PERIODICAL: Vestnik AN SSSR, 1957, Vol. 27. Nr 11, pp. 137-139 (USSR)

ABSTRACT: Scientists from Yugoslavia, the West- and Easteuropean countries, Australia, the USA, Canada, the USSR, Scandinavia and the state of Israel participated in the symposium held from July 29 to August 3. More than 60 speakers got a hearing. The soviet delegation read 6 papers: Ye.F.Gross talked on "The vibration spectrum of the hydrogen bond". D.N.Shigorin on "The nature of the hydrogen bond and its influence upon the vibration- and electron-spectra of the molecules", V.M.Chulanovskiy on "The spectroscopic investigation of the hydrogen bond", M.V.Vol'kenshteyn on "The behavior of the hydrogen bonds in vitrification (steklovaniye)", N.D.Sokolov "On the quantum theory of the hydrogen bond". A.N.Terenin and V.Filimonov "The hydrogen bond between adsorbed molecules and the structural OH-groups on the surface of solid bodies". Many papers were devoted to the spectroscopy of the hydrogen bond. Important information was

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An International Symposium on the Hydrogen Bond in Ljubljana. 30-11-22/23

given by Dzh.Pimentel (USA) on the spectral properties of the compounds at low temperatures and G.Marrinan (England) on the investig tion-results of the crystalline modifications of cellulose by means of the method of polarized infrared spectra. E. Lippert (German Federal Republic) gave an extensive survey of the influence exerted by the hydrogen bonds upon the electron-spectra. The session in which the participants especially dealt with the problems of the crystallography of the compounds with those of hydrogen, was opened by Dzh.Bernal, England, with an extensive report on the part played by the hydrogen bonds in solids and in liquids for which the participants showed great interest. R.Pepinskiy (USA) talked on the investigation of the hydrogen bond by means of the X-ray and neutronographic method. U.Shneyder (Canada) and others also dealt with this method. The following sessions mainly dealt with problems of the theory of the hydrogen bond. Speaker was: Ch.Koulson, England. His statement caused a lively discussion in which above all the American scientists participated. Although there exists no strict definition on the conception of the hydrogen bond, , all participants in the discussion agreed that the evidence of the quantum-mechanical process of the formation of a donor-acceptor

Card 2/3 bond (donorno-aktseptornaya svyaz') were necessary for the

determination of the hydrogen bond.

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VOL'KENSHTEYN, M.V.

Optical properties and the chemical structure of anthracene-polystyrene plastics. E. V. Anufrieva, M. V. Vol'kenshtein, and M. M. [illegible] Conquals [illegible] atoms [illegible] band in the [illegible] displaced towards the longer wave [illegible] and the [illegible] time increased from 5.6 × [illegible] for A bound to styrene. When the 9,10-H atoms in A were substituted the optical properties of the polymer were not changed by polymerization. Part of the 9-Cl-A and 9-Me-A became attached to the polymer chain with the substitution of the 10-H atom. The interaction of A and its 9-substituents with styrene during the polymerization were explained by their inhibiting action on the styrene polymerization, and the resulting smaller mol. wt. of the polymers formed. W. M. Sternberg

VOL'KENSHTEYN, M. V.

20-3-36/59

AUTHORS Pokrovskiy, Ye. I., and Vol'kenshteyn, M.V.

TITLE A Study of Isotactic Polypropylene by Means of Infrared Spectra. (Issledovaniye izotakticheskogo polipropilena metodom infrakrasnykh spektrov).

PERIODICAL Doklady Akademii Nauk, 1957, Vol. 115, Nr 3, pp. 552 - 553 (USSR.).

ABSTRACT Specimens obtained from different methods were investigated in the form of membranes o'2 mm thick. Bands were found at 72o, 73o, 79o, 81o, 839, 935, 969, 992, 105o, 1108, 117o, 1376, 146o, 285o, 2924 and 2975 cm^{-1}. Only one of these bands 935 cm^{-1} diverges from the spectres mentioned by NATTA and his collaborators. This extremely soft band does not appear in all specimens. The occurrence of the bands 894 and 992 cmm^{-1} is characteristic for the isotactic crystalline polymer. They are very soft, if the fraction is extracted with ether. When the polymer is heated to 14o - 15o°C, the spectrum changes, so that the bands 81o, 839, 894 and 992 cm^{-1} are softened. This proves, that the melting point T_{pl} of isotactic polypropylen is at about

16o - 17o°C. Apparently the latter bands can be considered as bands of crystal state. From the curve of the dependency of the transmissivity at the band maximum 992 cm^{-1} the melting temperature of the polymer can be determined. The value of the degree of crystallization was found to be 75, 9o and 1oo % respectively in the case of three

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A Study of Isotactic Polypropylene by Means of Infrared Spectra.

specimens. These values do not claim to be of high quantitative exactness, for the measurements were made according to the method of differential intensity. There is good reason to maintain, however, that this value is very high in the case of the samples under investigation. (There are 2 figures, and 2 Slavic references).

ASSOCIATION Institute for Polymolecular Compounds AN USSR. (Institut vysokomolekulyarnykh soyedineniy Akademii Nauk SSSR.).

PRESENTED by Academician A.V.Topchiyev, February 13, 1957

SUBMITTED February 6, 1957.

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also the fluctuation of orientation freeze in. These fluctuations thus, make their contribution towards the central component in glasses. The fluctuations in the concentration freeze in in the inhomogeneous liquids, so that the velocity of their dissolving caused by diffusion depends to a considerable extent upon temperature. This theory is suited apparently also for viscous liquids. In the case of fluctuations Δv_1 glass formation partly can start sooner than in the other liquids. There are 16 references, 15 of which are Slavic.

ASSOCIATION: Institute for Highly Molecular Compounds AN USSR (Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR)

PRESENTED: May 15, 1957, by A. F. Ioffe, Academician

SUBMITTED: May 13, 1957

AVAILABLE: Library of Congress

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VOLKENSHTEYN, M. V.

"Amorphous and Crystalline State of Polymers."

report presented at the Conf. on Mechanical Properties of Non-Metallic Solids. Leningrad USSR, 19-26 May 1958.

Inst. of High-Molecular Compounds, Acad.Sci.USSR, Leningrad

51-4-3-26/30

VOL'KENSHTEYN, M.V.

AUTHORS: Anufriyeva, Ye.V., Vol'kenshteyn, M.V. and Razgovorova, T.V.

TITLE: Study of Vitrification by a Luminescence Method. (Izucheniye steklovaniya metodom lyuminestsentsii.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp.414-415 (USSR)

ABSTRACT: The authors studied the following luminescent plastics: polyvinyl alcohol containing crystal violet, polyvinyl alcohol with auramine, ethyl cellulose with auramine, polyvinylbutyral with auramine, and polyvinylbutyral with Michler's ketone. The authors also studied glucose with auramine. The polymers were used in the form of films 30-50 μ thick. The amount of luminescent dyes present in polymers was 0.5-5%. Luminescence was excited by means of mercury lines. The fluorescence spectra were recorded by means of a monochromator UM-2 and a photomultiplier FEU-19. Dependence of the fluorescent intensity I on temperature was measured at a wavelength correspond-ing to the maximum of fluorescence (495 mμ for auramine, 638 mμ for crystal violet, 500 mμ for Michler's ketone). For all the substances studied,

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Study of Vitrification by a Luminescence Method.

with the exception of ethyl cellulose, a sharp break was found in the curve of the temperature dependence of the fluorescent intensity I at the vitrification temperature T_g. This break is most pronounced when auramine is used (curve 1 in Fig.1 shows auramine in polyvinylbutyral). In the case of ethyl cellulose the vitrification temperature lies outside the studied interval of temperatures (20-100°C) and therefore no break is shown in the fluorescent intensity curve (Fig.1, curve 2). The value of T_g was found to depend a little on the rate of heating or cooling. In agreement with predictions of the theory in Ref.5 the curves of the temperature dependence of the fluorescent intensity show hysteresis near T_g on successive heating and cooling of samples (Fig.2). There are 2 figures and 6 references, of which 5 are Soviet and 1 American.

ASSOCIATION: Institute of High-Molecular Compounds, Academy of Sciences of the USSR (Institut vysokomolekulyarnykh soyedineniy AN SSSR)

SUBMITTED: July 13, 1957.

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1. Plastics--Luminescence--Theory 2. Plastics--Fluorescent spectra 3. Photomultipliers--Applications 4. Monochromators--Applications

SOV/30-58-9-41/51

AUTHOR: Vol'kenshteyn, M. V., Doctor of Physico-Mathematical Sciences

TITLE: Investigation of Mechanical Properties of Non-Metals (Izucheniye mekhanicheskikh svoystv nemetallov) Conference in Leningrad (Konferentsiya v Leningrade)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 9, pp. 109 - 111 (USSR)

ABSTRACT: The Mezhdunarodnyy soyuz chistoy i prikladnoy fiziki i Akademiya nauk SSSR (International Society of Pure and Applied Physics and the AS USSR) held a conference from May 19th to 24th. A.F.Ioffe, Member, Academy of Sciences, USSR, made the opening-speech. Further reports were delivered by:
S.N.Zhukov on the influence of time and temperature on the strength of a great variety of materials.
B.V.Deryagin, M.S.Metsik on the part played by electric energies at the cleaving process of mica.
A.V.Stepanov on the destruction modes of crystals.
R.I.Garber, I.A.Gindin, L.M.Polyakov on the characterization of plastic deformations by means of the micro-fissures occurring.

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Investigation of Mechanical Properties of Non-Metals. SOV/30-58-9-41/51
Conference in Leningrad

Yu.N.Ryabinin on the results of researches on plasticity.
A.N.Orlov, Yu.M.Plishkin on the results of theoretical calculations on stability conditions of a crystal model.
T.A.Kontorova on the influence of anharmonic oscillations of a lattice on plastic deformation.
M.V.Klassen-Neklyudova, V.A.Indenbom, A.A.Urusovskaya, G. Ye. Tomilovskiy on the results of optical crystal research.
M.P.Shaskol'skaya, Sun'Zhuyfan on observation of plastic deformation in rock-salt.
A.A.Chernov on a kinetic equation for "steps" on the crystal surface.
G.G.Lemleyn, Ye.D.Dukova presented a film on the formation of displaced growth centers and the vaporization of crystals.
V.N.Rozhanskiy, Yu.V.Goryunov, Ye.D.Shchukin, N.V.Pertsov observed the emersion of dislocations on the crystal surface as well as the development of fissures.
R.I.Garber, Ye.A.Tsinzerling, M.A.Chernysheva on Problems of mechanic twin formation of crystals.
Ye.M.Yelistratov gave values obtained by radiographic examinations of mixed crystals and metallic alloys.

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Investigation of Mechanical Properties of Non-Metals. SOV/30-58-9-41/51
Conference in Leningrad

D.M.Vasil'yev examined micro-voltage occurring at plastic deformation in crystals.
M.I.Bessonov, S.K.Zakharov, G.A.Lebedev, Ye.A.Kuvshinskiy on the strength of amorphous bodies, especially polymers.
S.N.Zhurkov, V.A.Marikhin, A.I.Slutsker on the submicroscopic porosity of deformed polymers.
A.S.Akhmatov, L.V.Koshlakova, M.V.Vol'kenshteyn, A.I.Kitaygorodskiy on defective crystallic states.
A.F.Ioffe, Member, Academy of Sciences, USSR, closed the conference.

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VOL'KENSHTEYN, M.V.

VOL'KENSHTEYN, M.V.

Macromolecules and biology. Izv.AN SSSR Ser.biol. 23 no.1:3-25 Ja-F '58. (MIRA 11:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
(MACROMOLECULAR COMPOUNDS)
(PHYSIOLOGICAL CHEMISTRY)

VOL'KENSHTEYN, M. V.

"Mechanism of Vitrification."

report presented at the 3rd All-Union Conference on the Vitreous State

Leningrad, 1959

Vol'kenshteyn, M.V.

21(0),24(0) PHASE I BOOK EXPLOITATION SOV/3...

Akademiya nauk SSSR. Fizicheskiy institut

Issledovaniya po eksperimental'noy i teoreticheskoy fizike; [sbornik] (Studies on Experimental and Theoretical Physics; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 334 p. Errata slip inserted. 2,300 copies printed.

Ed.: I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; Eds. of Publishing House: A. L. Chernyak and V. G. Berkgaut. Tech. Ed.: Yu. V. Rylina; Commission for Publishing the Collection in Memory of Grigoriya Samuilovich Landsberg: I. Ye. Tamm (Chairman), Academician; M. A. Leontovich, Academician; P. A. Bazhulin, Doctor of Physical and Mathematical Sciences; S. L. Mandel'shtam, Doctor of Physical and Mathematical Sciences; I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; F. S. Landsberg-Baryshanskaya, Candidate of Physical and Mathematical Sciences; and S. P. Motulevich (Secretary), Candidate of Physical and Mathematical Sciences.

PURPOSE: This book is intended for physicists and researchers engaged in the study of electromagnetic radiations and their role in investigating the structure and composition of materials.

COVERAGE: The collection contains 30 articles which review investigations in spectroscopy, sonics, molecular optics, semiconductor physics, nuclear physics, and other branches of physics. The introductory chapter gives a biographical profile of G. S. Landsberg, Professor and Head of the Department of Optics of the Division of Physical Technology at Moscow University, and reviews his work in Rayleigh scattering, combat gases, spectral analysis of metals, etc. No personalities are mentioned. References accompany each article.

5(3) PHASE I BOOK EXPLOITATION SOV/2611

Vol'kenshteyn, Mikhail Vladimirovich

Konfiguratsionnaya statistika polimernykh tsepey (Configuration Statistics of Polymeric Chains) Moscow, Izd-vo AN SSR, 1959. 466 p. 6,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut vysokomolekulyarnykh soyedineniy.

Ed.: S.Ye. Bresler, Doctor of Chemical Sciences, Professor; Ed. of Publishing House: S.Ya. Frenkel'; Tech. Ed.: M.Ye. Zendel'.

PURPOSE: This book is intended for chemists specializing in the field of polymer chemistry.

COVERAGE: The author discusses the theoretical aspects of polymer physics. He concentrates on those aspects which are directly connected with the geometrical configurations of polymeric chains, with their thermodynamic flexibility. The introductory chapter,

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Configuration Statistics of Polymeric Chains SOV/2611

reviews briefly the thermodynamics of polymer solutions and the theory of polyelectrolytes, gives a general outline of polymer physics and shows that the important physical properties of polymers are connected with the flexibility of polymeric chains. The physical kinetics of polymers is not treated in this book. Chapters two and three cover the properties of small molecules and give a fairly complete review of experimental and theoretical research on the internal rotation and rotational isomerization of small molecules. The following chapters include configurational statistics of polymeric chains, the theory of dimensions, dipole moments and optical anisotropy of macromolecules, and the theory of the behavior of polymeric chains during the fusion of crystals, extension, and in certain biological processes. The final chapters discuss the theory of polymeric chains in network structures, which is the basis of the physics of elasticity of rubber-like materials. The book is based primarily on the work performed by the author and his coworkers during 1950-1958, at the Laboratory for Study of the Structure of Polymers of the Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR (Institute of High Molecular Weight Compounds, Academy of Sciences, USSR) and at the Department of Theoretical Physics of the Leningradskiy pedago-

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gicheskiiy institut imeni Gertsena (Leningrad Pedogogical Institute imeni Gertsen). The text includes a comprehensive review and critical analysis of pertinent foreign works. T.M. Birshteyn, Yu. Ya. Gotlib, and O.B. Ptitsyn cooperated in the writing of this book. References appear at the end of each chapter.

TABLE OF CONTENTS:

BOLOTINA, I.A.; BAZHENOV, N.M.; VOL'KENSHTEYN, M.V.; SOGOMONYANTS, Zh.S.

Effect of the vitrification of polymers on their optical activity.
Fiz. tver. tela 1 no.3:489-498 Mr '59. (MIRA 12:5)

1. Institut vysokomolekulyarnykh soyedineniy, Leningrad.
(Polymers--Optical properties)

BAZHENOV, N.M.; VOL'KENSHTEYN, M.V.; KOL'TSOV, A.I.; KHACHATUROV, A.S.

Investigating polymers by the method of nuclear magnetic resonance. Part 1. Vysokom.soed. 1 no.7:1048-1055 Jl '59. (MIRA 12:11)

1. Institut vysokomolekulayrnkh soyedineniy AN SSSR.
(Polymers)

VOL'KENSHTEYN, M.V.; GOTLIB, Yu.Ya.; PTITSYN, O.B.

Theory of high elasticity of rubbers. Vysokom.soed. 1 no.7:1058-1062 Jl '59. (MIRA 12:11)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Rubber, Synthetic)

VOL'KENSHTEYN, M.V.; GOTLIB, Yu.Ya.

Entropy elasticity of a polymer containing anisotropic rigid particles. (MIRA 12:11)
Vysokom.soed. 1 no.7:1063-1069 Jl '59.

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Polymers)

67299

5.3831
~~24(7),24(6)~~

AUTHORS: Bazhenov, N.M., Bykov, M.I., Volkova, L.A., Vol'kenshteyn, M.V. SOV/181-1-8-4/32

TITLE: Photoelastic Effect in Polymethylmethacrylate, Polybutylmethacrylate, and Polyvinylacetate

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 8, pp 1179-1187 (USSR)

ABSTRACT: The authors investigated the kinetics of the internal rotation in polymers by the method of photoelasticity which at the same time allowed measurement of birefringence and strain with a constant true stress on the sample. The authors were interested in the relaxation phenomena in organic glasses. M.N.Zhurina and O.N.Trapeznikova (Ref 1) had obtained important data on internal rotation. In the present work two types of polymethylmethacrylate differing in their way of production and in their temperature of vitrification. The photoelastic effect was investigated in a wide range of deformations and temperatures by means of a device described already earlier (Ref 4). The most important results which are given in several diagrams are the increase of negative birefringence during cooling and its decrease and transition to positive values when the polymethylmethacrylate samples are heated. Both polymethylmethacrylate

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Photoelastic Effect in Polymethylmethacrylate, Polybutylmethacrylate, and Polyvinylacetate

types have a hysteresis with an extraordinary course, namely, counterclockwise. In the case of repeated passing of the heating and cooling cycles in one and the same polymer sample the same hysteresis loops are obtained. A stronger strain of the polymer sample renders temperature dependence more stringent. The photoelastic effect $\Delta\varepsilon$ reaches saturation already with relatively small deformations. In the case of heating and strain of the stretched polyvinylacetate film birefringence depends only slightly on temperature, which holds also in the stretching of polybutylmethacrylate films. When the stretched polybutylmethacrylate films are heated or cooled, a temperature dependence of birefringence in the case of fixed final expansion was not observed. The birefringence hysteresis of polymethylmethacrylate observed in heating and subsequent cooling is indicative of a non-uniform relaxation behavior of the polymer under the present experimental conditions. The elementary theory of birefringence relaxation is based on a kinetic equation. Polymethylmethacrylate anisotropy is obviously caused only by anisotropy of the lateral $COOCH_3$ and CH_3 groups. CH_3 groups

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Photoelastic Effect in Polymethylmethacrylate, Polybutylmethacrylate, and Polyvinylacetate SOV/181-1 -8-4/32

obviously cause positive birefringence. Negative birefringence is caused by the highly isotropic double bond C=O which lies in the plane perpendicular to the strain plane of the chain. Besides, negative birefringence of polyvinylacetate is determined only by the carbonyl group. The "anomalous" hysteresis found in polymethylmethacrylate is caused by the existence of two relaxation mechanisms with highly differing relaxation times. These mechanisms are related with the structure of the polymethylmethacrylate chain. The polymethylmethacrylate sample with higher vitrification temperature shows a shift of the temperature course of birefringence toward higher temperatures. The absence of hysteresis phenomena in polybutylmethacrylate and polyvinylacetate may be explained by the structure of these polymers. There are 14 figures, 1 table, and 6 Soviet references.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy, AN SSSR, Leningrad (Institute of High-molecular Compounds of the AS USSR, Leningrad)

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SUBMITTED: August 1, 1958

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15.9100
~~15 (9)~~

67314

SOV/181-1-8-19/32

AUTHORS: Volkova, L. A., Vol'kenshteyn, M. V.

TITLE: Radiographic Investigation of the Swelling of Natural Rubber

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 8, pp 1272 - 1278 (USSR)

ABSTRACT: The ability of the crystalline polymers to undergo specific re-crystallization when under strain, which has been found by V. A. Kargin and T. I. Sogolova (Ref 4), is closely connected with the presence of crystalline and amorphous substances in the polymer. The authors do not agree with Kargin and G. L. Slonimskiy (Ref 1) who assume that crystalline and amorphous modification in the polymer are in equilibrium. V. A. Kargin, A. I. Kitaygorodskiy, and G. L. Slonimskiy put forward a new interpretation concerning the amorphous phase of the polymers. The present paper deals with kinetic disturbances in polymer crystallization. In the authors' laboratory B. Z. Volchek (Ref 8) investigated the effect of heat upon the content of amorphous substance in a polymeric polycrystal. The first part of the present paper deals with experiments. Natural rubber, crystallized during storage, served as test object, kerosene as solvent. The radiographic method is based upon a micro-

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Radiographic Investigation of the Swelling of Natural Rubber SOV/181-1-8-19/32

photometric comparison between the intensities of the amorphous halos in the radiograms of a perfectly amorphous rubber and of a partly crystalline solidified or strained rubber. Applying this method the authors determined the "degree of crystallization" of natural rubber with various degrees of swelling in kerosene. Three tables illustrate the degree of crystallization of the swollen rubber, data on a sample for increasing swelling up to 17%, and data on a number of rubber samples with different degree of swelling. In the case of low swelling degree (3.5 to 7%) the radiograms of the rubber samples resemble those of non-swollen crystalline rubber but the intensity of the rings increases. In the case of further swelling, intensity and sharpness of the rings decreases. However, the intensity of the amorphous halo decreases. With a swelling of up to about 15 to 20% the crystal interferences vanish completely. When natural rubber swells in kerosene, the degree of crystallization passes through a maximum and then gradually decreases towards zero. The distances between the separate crystal faces do not change during swelling. The solvent does not penetrate into the crystal lattice of the polymer but into its amorphous regions. The reduction of

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Radiographic Investigation of the Swelling of Natural Rubber SOV/181-1-8-19/32

the crystalline part in highly swollen samples may be interpreted to be a melting of the crystalline polymer when a low-molecular solvent is present. For slight swellings the "degree of crystallization" is explained by the anisotropy of the amorphous part of the polymer. The introduction of a solvent reduces the strains in the amorphous part of the polymer and allows the chains to approach equilibrium. The absence of an observable effect in the desorption of the solvent from the swollen rubber sample may also be explained by the kinetics of crystallization. There are 3 tables and 12 references, 7 of which are Soviet.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad (Institute of High-molecular Compounds of the AS USSR, Leningrad)

4

SUBMITTED: August 1, 1958

Card 3/3

VOL'KENSHTEYN, M. V. (IVS AS USSR, Leningrad)

M. V. Vol'kenshteyn, "Interior Rotation and Rotational Isomerization in Small and Big Molecules."

report presented at the Symposium on Concepts of Conformation in Organic Chemistry which took place in Moscow at the IOKh AN SSSR (Institute of Organic Chemistry, AS USSR) from September 30 to October 2, 1958.

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1959, No. 3, 561-564.

M.V. Vol'kenshteyn

5(0)
AUTHOR: None Given SOV/62-59-3-36/37

TITLE: General Meetings of the Department of Chemical Sciences of the Academy of Sciences, USSR on October 23 and November 27-28, 1958 (Obshchiye sobraniya Otdeleniya khimicheskikh nauk Akademii nauk SSSR 23 oktyabrya i 27-28 noyabrya 1958 g.)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 3, pp 564-568 (USSR)

ABSTRACT: This is a report on the General Meetings of the Department of Chemical Sciences, AS USSR. On October 23, 1958 the General Meeting of the Department of Chemical Sciences of the AS USSR took place under the chairmanship of Academician N. N. Semenov. A. V. Novoselova delivered a lecture on the "Investigations in the Field of Tellurium Chemistry". She emphasized the fact that the interest in tellurium has considerably increased in the course of the last years because of the valuable semiconductor properties of tellurium and numerous tellurides. In her lecture Novoselova reported on the production of pure tellurium, on the investigations of the behavior of admixtures and on investigations of numerous tellurides. The lecturer was asked numerous questions. M. A. Poray-Koshits, Candidate of

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Physical and Mathematical Sciences spoke on the "Stereochemistry of Complex Compounds of Bivalent Nickel". On the basis of direct X-ray structural analyses carried out at the Institut obshchey i neorganicheskoy khimii AN SSSR (Institute of General and Inorganic Chemistry, AS USSR) and the MGU it was found that all ammonia thiocyanate compounds of nickel which are separated from the solution at different concentrations represent, according to their structural character, complex six-coordination compounds. The analysis of the crystalline structures makes it possible to set up common crystallochemical rules in the series of ammonia thiocyanate compounds. G. B. Bokiy and S. Z. Roginskiy, Corresponding Members, AS USSR, took part in the discussion. M. G. Gonikberg, Doctor of Chemical Sciences spoke on the "Application of High Pressure in the Investigation of the Transition Stage and the Mechanism of Reaction". By means of experimental data the lecturer proved that the application of high pressure opens new prospects in this field. S. Z. Roginskiy B. V. Deryagin, Corresponding Members, AS USSR, M. I. Temkin

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and A. I. Kitaygorodskiy, Doctors of Chemical Sciences took part in the discussion. On the occasion of the general meeting held under the chairmanship of Academician A. P. Vinogradov from November 27 to 28, 1958 N. I. Nikitin, Corresponding Member, AS USSR and G. A. Petropavlovskiy, Candidate of Technical Sciences spoke on the "Properties of Low-substituted Cellulose Nitrates and Their Solutions". The following scientists took part in the discussion: S. N. Danilov, Corresponding Member, O. P. Golova, Doctor of Chemical Sciences, et al. G. V. Samsonov, Doctor of Chemical Sciences spoke on the "Specific Sorption of Ions of Organic Substances". The synthesis of weakly swelling ion-exchange resins, which cannot absorb certain ions of organic substances allow the establishment of a new effective method of producing chemically pure streptomycin and penicillin. The lecturer was asked many questions. M. V. Vol'kenshteyn, Doctor of Physical and Mathematical Sciences dealt with the "Problems of Statistical Physics of the Polymer Chains". The lecturer and his collaborators have developed a general statistical method of

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computing the properties of macromolecules which is based on the application of the rotational isomer model. The following scientists took part in the discussions: V. I. Ivanov, Doctor of Chemical Sciences B. V. Deryagin and V. G. Levich, Corresponding Members, AS USSR. V. N. Tsvetkov, Doctor of Physical and Mathematical Sciences spoke on the "Intermolecular Interaction and the Form of Macromolecules in Solutions". The lecturer demonstrated that the molecular weight of the fraction may be determined by a joint determination of the characteristic viscosity and diffusion. B. V. Deryagin, Corresponding Member, AS USSR, M. V. Vol'kenshteyn, Doctor of Physical and Mathematical Sciences and A. I. Kitaygorodskiy, Doctor of Chemical Sciences took part in the discussion.

SOV/51-7-2-10/34

AUTHORS: Aslanyan, V.M. and Vol'kenshteyn, M.V.

TITLE: Optical Activity and Intermolecular Interaction (Opticheskaya aktivnost' i mezhmolekulyarnoye vzaimodeystviye)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 2, pp 208-216 (USSR)

ABSTRACT: Optical activity (natural rotatory power) is very sensitive to internal and intermolecular interactions: optical activity of one substance in different solvents may differ by 100% or more in magnitude and its sign may be reversed. The present paper discusses the effect of intermolecular interaction on optical activity of solutions in polar and non-polar solvents, using models which take into account directly the polarizability of a molecule and its components. In the first approximation such a discussion may have a classical basis; it is then sufficient for studies of dilute solutions. Quantum-mechanical effects have to be taken into account when concentrated solutions and pure liquids are discussed, since in this case resonance interaction is important. The theory of optical activity presented by the authors is based on the valence-optical scheme

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Optical Activity and Intermolecular Interaction

with tensors of polarizability ascribed to individual bonds and groups of atoms in a molecule. Optical activity is then the result of induction-type interaction of groups which are asymmetrically distributed and anisotropically polarized. The theory is compared with experimental results obtained on d-pinane, d-limonene and l-menthylmethylnaphthalate and good agreement is reported. There are 5 figures and 12 references, 6 of which are Soviet and 6 English.

SUBMITTED: February 19, 1959

SOV/51-7-4-11/32

AUTHORS: Anufriyeva, Ye.V., Vol'kenshteyn, M.V. and Razgovorova, T.V.

TITLE: Vitrification of Polymers and Luminescence

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 4, pp 505-510 (USSR)

ABSTRACT: The paper describes a study of mobility of macromolecules and vitrification of polymers, using luminescence of certain molecules introduced into these polymers. It is known that the luminescence of "non-rigid" molecules depends strongly on the viscosity of the medium, falling with decrease of viscosity (Refs 4-6). This is because luminescing molecules lose their energy of excitation which is transferred to internal rotation; such a transfer occurs more easily when viscosity of the surrounding medium is low. On vitrification the polymer viscosity rises sharply and the mobility of macromolecules or their parts falls considerably. Dyes placed in small quantities in polymers undergoing vitrification were found to be sensitive to these changes of viscosity: for example intensity of luminescence of auramine or Mikhler's ketone present in polyvinylbutyral shows a discontinuity at 70°C which is the vitrification temperature (T_g) of polyvinylbutyral (Ref 7). The present paper deals with several other polymers which contained small amounts of phosphors consisting of "non-rigid" (auramine) and "rigid" (rhodamine B,

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rhodamine G, rhoduline orange, safranine) molecules. The authors measured the temperature dependence of luminescence of the system polymer-phosphor at temperatures from +20 to +120°C (this range included T_g temperatures of all polymers studied). Luminescence was excited with 436 or 365 mμ mercury lines. The temperature dependences of the fluorescence maximum and the total emission were recorded both on heating and cooling. A photomultiplier FEU-19 was used as a receiver. The authors recorded also the fluorescence spectra at various temperatures below and above T_g of the polymer-phosphor systems. The spectra were measured using a monochromator UM-2 and a photomultiplier FEU-19. The samples were in the form of films 20-30 μ thick. The phosphors were introduced into polymers either by simultaneous dissolution of the polymer and the phosphor (dye) with subsequent removal of the solvent or by adsorption of the dye on the polymer film. The phosphors were present in amounts varying from 0.5 to 5%. "Non-rigid" molecules of auramine were introduced into polyvinyl acetate, polyvinylformal, polyvinyl alcohol, polystyrene, polychlorvinyl, polymethyl methacrylate. The temperature dependences of the luminescence intensity I(T) are shown in Figs 1 and 2. In all cases the luminescence intensity had a discontinuity at T_g. Two discontinuities were observed on the I(T) curves of polyvinyl alcohol and

polyvinylformal. One of these discontinuities occurred at T_g and the other at a lower temperature. The discontinuity at T_g in all polymers implies stronger quenching of luminescence of auramine above T_g; this is due to transfer of the electron energy to vibrations and rotations (rotation of benzene rings of auramine with respect to one another). The second discontinuity at $T < T_g$ is due to final disappearance of the residual mobility of macromolecules within the molecular "net" of the vitrified polymers. In experiments with phosphors consisting of molecules with "rigid" structure it was found that the presence of the discontinuity on the I(T) at T_g depended on the choice of the polymer and the phosphor. A discontinuity at T_g was observed in the case of rhodamine B in polyvinylbutyral (Fig 4, curve 3), but not in the case of rhodamine B in polyvinyl alcohol (Fig 4, curve 2) or in polyvinylformal (Fig 4, curve 1). No discontinuity was observed at T_g in the case of rhoduline orange in polyvinylbutyral (Fig 3, curve 2) but it was observed when rhoduline orange was introduced into polyvinyl alcohol (Fig 3, curve 1) or polyvinylformal. Discontinuities at T_g were also observed in safranine-polyvinylbutyral (Fig 5, curve 1) and safranine-polyvinylformal (Fig 5, curve 2) systems. All this indicates that quenching of

SOV/51-7-4-11/32

Vitrification of Polymers and Luminescence

luminescence of "rigid" molecules above T_g is governed by the nature of interaction between the phosphor molecules and the polymer macro-molecules. These interactions may be in the form of transfer of the electron energy of the phosphor molecules to the polymer macromolecules or in the form of photochemical reactions which produce irreversible changes in the phosphor molecules. There are 5 figures and 10 references, 8 of which are Soviet and 2 English.

SUBMITTED: March 3, 1959

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24(7),7(3),5(4) SOV/48-23-10-14/39

AUTHORS: Pokrovskiy, Ye. I., Vol'kenshteyn, M. V.

TITLE: The Investigation of Isotactic Polymers by Means of Infrared Spectroscopy

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 10, pp 1208-1209 (USSR)

ABSTRACT: The authors investigated the infrared spectra of isotactic polypropylene (PP) and polystyrene (PS) in the range of 3000 - 400 cm^{-1}, by using the spectrometers of the type IKS-2 and IKS-11 with LiF-, NaCl- and KBr-prisms. In the case of PP the film thickness was $\sim 200 \mu$, in that of PS it was $\sim 25 \mu$. The spectra were recorded within the temperature range between room temperature and the melting point of the polymers. The absorption spectra of crystalline and melted isotactic PP in the range of 800 - 900 cm^{-1} differ neither from one another nor from the spectrum of atactic PP (Fig 1). In the absorption spectrum of crystalline PP the intense band varies at 992 cm^{-1}, the intensity of which depends on the crystallinity degree of the "amorphity" PP (Fig 2). As the method for determination of the

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degree is not accurate enough at 790 cm^{-1} for the determination of the degree of crystallinity, the authors used the band at 992 cm^{-1} for this purpose. The percentage of the crystallinity of PP was measured by measuring the optical density of the band at 969 cm^{-1} (standard) and 992 cm^{-1}. 96% was obtained. In isotactic PS a number of bands in the crystalline state was found (Fig 3). The most intensive of them were at 775, 840, 916, 1315 and 1360 cm^{-1}. In the more long-wave range of the spectrum of atactic PS two bands were found at 560 and 540 cm^{-1}, in isotactic PS only one was found at 560 cm^{-1}. A solution of the PS resulted in no variation of band intensities. There are 3 figures and 2 Soviet references.

SOV/53-67-1-7/12

5(4)

AUTHOR: Vol'kenshteyn, M. V.

TITLE: Problems of the Theoretical Physics of Polymers (Problemy teoreticheskoy fiziki polimerov)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 1, pp 131 - 161 (USSR)

ABSTRACT: Owing to the numerous possibilities of using polymers, and to their ever-increasing importance, important tasks have to be performed in the fields of chemistry, technical engineering, and physics. In physics, the main problem is that of investigating the connection between the chemical structure of polymers and their physical properties. Apart from purely scientific considerations, it is the aim of these investigations to obtain synthetic material of given properties. In the present article, the author gives a survey of the present stage of the theoretical physical chemistry of polymers, which was compiled from numerous articles published in USSR and in other countries. In his introduction the author discusses basic problems, methods of investigation, and their aims. The second chapter deals with the configuration statistics of chain polymers; the formation

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and structure of such macromolecules are discussed. A very detailed account is given of the physical problems of rubber elasticity. A further chapter deals with the vitrification of low-molecular liquids and polymers. Finally, the crystalline state of polymers and its investigation by means of roentgenography and infrared spectral analysis is discussed. The survey was compiled from numerous papers by both Western and Soviet authors. Follow some Soviet research scientists mentioned: V. A. Kargin, S. Popkov, Z. A. Rogovin, A. A. Tager, O. B. Ptitsyn, S. N. Zhurkov, B. N. Narzullayev, A. P. Aleksandrov, Yu. S. Lazurkin, P. P. Kobeko, Ye. V. Kuvshinskiy, G. I. Gurevich, G. L. Slonimskiy, Yu. Ya. Gotlib, S. Ye. Bresler, Ya. I. Frenkel', I. I. Novak, T. M. Birshteyn, Yu. A. Sharonov, E. K. Byutner, I. N. Godnev, V. N. Tsvetkov, S. V. Vopsovskiy, Ya. S. Shur, Yu. B. Rumer, B. Z. Volchek, A. I. Kitaygorodskiy, G. L. Slonimskiy, N. F. Bakeyev, Kh. Vergin, V. S. Klimenkov, B. Ya. Levin, Ya. I. Frenkel', Ye. F. Gross, Ya. I. Ruskin, N. I. Shishkin, N. M. Bazhenov, I. A. Bolotina, Ye. V. Anufriyeva, T. V. Razgovorova, Yu. M. Malinskiy, T. I. Sogolova, V. N. Nikitin, Ye. I. Pokrovskiy and L. A. Volkova. There are 7 figures and 130 references, 63 of which are Soviet.

21(2), 15(0) SOV/53-67-1-10/12

AUTHOR: Vol'kenshteyn, M.

TITLE: Conference on the Mechanical Properties of Non-Metals (Konferentsiya po mekhanicheskim svoystvam nemetallov)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 1, pp 177 - 184 (USSR)

ABSTRACT: This conference on the mechanical properties of nonmetal solids was organized by the International Union for Pure and Applied Physics and by the Akademiya nauk SSSR (Academy of Sciences, USSR). It took place at Leningrad from May 19 to May 24, 1958. The conference was opened by Academician A. F. Ioffe. He spoke about various problems and methods in crystal physics. The next speaker was S. N. Zhurkov (Fiziko-tekhnicheskiy institut AN SSSR- Physico-Technical Institute of the AS USSR), Leningrad, who spoke about the physical problems of the strength of solids. Further lectures: B. V. Deryagin and M. S. Metsik (Institut fizicheskoy khimii AN SSSR - Institute of Physical Chemistry of the AS USSR) on the part played by electric forces in the cleaving of mica along the cleavage surfaces; A. V. Stepanov (Physico-Technical Institute of the AS USSR) on character-

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istic crystal data; R. I. Garber and his collaborators I. A. Gindin, L. M. Polyakov(Fiziko-khimicheskiy institut AN USSR, Khar'kov - Physico-Chemical Institute AS UkrSSR, Khar'kov) on the parasitic deformation according to the theory of micro-cracks; Yu. N. Ryabinin (Laboratoriya fiziki vysokikh davleniy AN SSSR - Laboratory for the Physics of High Pressures of the AS USSR), Moscow, on plasticity measurements in the axial rotation of cylindrical samples under high hydrostatic pressure; A. N. Orlov and Yu. M. Plishkin (Institut fiziki metallov AN SSSR - Institute for Metal Physics of the AS USSR),Sverdlovsk, on the equilibrium conditions of an atomic chain in a homogeneous crystal at a certain interaction energy;T. A. Kontorova (Institut poluprovodnikov AN SSSR - Institute for Semiconductors of the AS USSR), Leningrad, on the process of plastic deformation in consideration of the influence of an-harmonic lattice oscillations; M. V. Klassen-Neklyudova, V. A. Indenbom, A. A. Urusovskaya and G. Ye. Tomilovskiy (Institut kristallografii AN SSSR - Institute for Crystallography of the AS USSR), Moscow, on optical investigations carried out on crystals with etching figures (Al_2O_3-LiF); M. P. Shaskol'skaya

and Sun' Jui -fang (Institut stali - Steel Institute), Moscow, on investigations of plastic deformation in rock salt; A. A. Chernov (Institute for Crystallography, Moscow), on the investigation of the step-structure of crystal surfaces during growth and solution by means of an equation of motion; G. G. Lemleyn and Ye. D.Dukova (Institute for Crystallography, Moscow), showed an interesting film about the formation of dislocation centers during the growth and vaporization of crystals. V. N. Rozhanskiy, Yu. V. Goryunov, Ye. D. Shchukin, and P. V. Pertsov (Moscow University and Institute of Physical Chemistry of the AS USSR), spoke about investigations of the reduction of superficial tension as a result of the adsorption of surface-active substances; three further lectures dealt with the processes of mechanical twinning; R. I. Garber (Physico-Technical Institute of the AS UkrSSR, Khar'kov), spoke about the mechanical properties of unitary twin layers, Ye. V. Tsinzerling (Institute for Crystallography of the AS USSR), reported on an interesting phenomenon found only in the impurity-containing quartz crystals: the "remembering capacity" of the crystal lattice (return to the primary state after annealing); M. A. Chernysheva (Institute for Crystallo-

graphy of the AS USSR, Moscow), spoke about the particular features of deformation of semisynthetic twins (Seignette-salt crystals).
Three further lectures dealt with deformation properties: Ye. M. Yelistratov (Institute for Semiconductors of the AS USSR, Leningrad), spoke about deformation phenomena in the decay of oversaturated solid solution, D. M. Vasil'yev (Politekhnicheskiy institut- Polytechnic Institute), Leningrad, on microtensions in polycrystals in the case of plastic deformation, and Yu. K. Auleytner (Warsaw) on the determination of block orientation by means of a sharp-focusing X-ray tube. A further session of the Conference was devoted to problems of the strength of amorphous bodies. Lectures were delivered by: M. I. Vessonov, S. K. Zakharov, G. A. Lebedev and Ye. V. Kuvshinskiy (Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR -Institute for High-Molecular Compounds of the Academy of Sciences, USSR), Leningrad, on investigations of the mechanical destruction of solid polymeric materials; S. N. Zhurkov, V. A. Marikhin, and A. I. Slutsker (Physico-Technical Institute AS USSR, Leningrad), on the submicroscopic porosity of deformed polymers;G. M. Bartenev (Institut stekla- Glass Institute), Moscow, on the influence

of size on the strength of glass. G. A. Lebedev and Ye. V. Kuvshinskiy (Institute for High-Molecular Compounds AS USSR, Leningrad) spoke about the determination of highly elastic deformation in amorphous materials of the polymethyl-metacrylate type in a solid state. The lectures of the next session dealt with incomplete crystal states. A. S. Akhmatov and L. V. Koshlakova (Institut mashinostroyeniya i priborostroyeniya - Institute for Machine- and Apparatus Construction), Moscow, spoke about the investigation of the elastic properties of twodimensional molecular aliphatic acid crystals formed upon crystal surfaces; M. V. Vol'kenshteyn (Institute for High-Molecular Compounds AS USSR, Leningrad) lectured on the amorphous and the crystalline state of polymers. G. L. Slonimskiy and A. I. Kitaygorodskiy took part in the disussion. A. I. Kitaygorodskiy (Institut elementoorganicheskikh soyedineniy AN SSSR- Institute for Element-Organic Compounds AS USSR), Moscow, then spoke about some physical problems of organic crystals. A. F. Ioffe made the closing speech.

15 (9) SOV/20-125-3-15/..

AUTHOR: Vol'kenshteyn, M. V.

TITLE: On the Structure and Mechanical Properties of Amorphous Polymers (O stroyenii i mekhanicheskikh svoystvakh amorfnykh polimerov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 523-525 (USSR)

ABSTRACT: The author first discusses the present state of the problem. It is interesting to investigate an amorphous polymer, using the physical analogy with ferromagnetics. This analogy is valid for the following very important properties: Ferromagnetics have a high susceptibility, which strongly depends on the field strength and temperature, and they have also spontaneous magnetization. The magnetization of ferromagnetics can be reduced to the removal of secondary causes which prevent spontaneous magnetization of a sample as a whole. A characteristic property of ferromagnetics is a magneto-caloric effect - the heating in the adiabatic magnetization. A ferromagnetic has a domain structure caused by two kinds of force: 1) non-magnetic exchange forces which determine the amount of spontaneous magnetization of

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On the Structure and Mechanical Properties of Amorphous Polymers

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the domain; 2) magnetic forces which determine the very existence, the shape and dimensions of the domain as well as the direction of its magnetization. The following properties of polymers correspond to the above-mentioned properties of ferromagnetics: Polymers are characterized by great pliability (which strongly depends on deformation and temperature) and have a spontaneous tendency to assume a higher degree of order. The expansion of polymers can be reduced to the removal of the secondary causes which prevent the spontaneous tendency of the sample as a whole to assume a higher degree of order. A characteristic property of polymers is the heating caused by adiabatic expansion. The polymer has a domain structure caused by the existence of two kinds of forces: 1) forces of intermolecular interaction (which [illegible] the spontaneous tendency of the domain to assume a higher degree of order); 2) intramolecular forces which determine the thermodynamic and kinetic flexibility of the chains and thus the very existence, the shape and dimensions of the domain. At last, non-equilibrium hysteresis phenomena occur in ferromagnetics as well as in polymers. This analogy, naturally,

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On the Structure and Mechanical Properties of Amorphous Polymers

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is a limited one, and their physical meaning can be [illegible] to a certain similarity in the statistics and kinetics [illegible] behavior of electron spins in the case of ferromagnetics [illegible] of the chain segments in the case of a polymer. The following interesting conclusions may be drawn from the above-mentioned similarity: 1) The formation of the domain structure of an amorphous polymer is a phase transition of the second kind, similar to the transition from the paramagnetic state to the ferromagnetic one. This interesting problem requires a detailed theoretical and experimental investigation. 2) Some conclusions concerning highly elastic deformation. The future theory of high elasticity perhaps will rely on the investigation of the behavior of the "blocks" during expansion, like the theory of technical magnetization which relies on the behavior of the domains. The taking into account of the blocks perhaps will allow the explanation of the divergencies between the net theory and experimental facts. The author then gives a calculation concerning these ideas. There are 1 figure and 14 references, 9 of which are Soviet.

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On the Structure and Mechanical Properties of Amorphous Polymers

SOV/[illegible]

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR (Institute for High-molecular Compounds of the Academy of Sciences USSR)

PRESENTED: December 3, 1958, by V. A. Kargin, Academician

SUBMITTED: November 27, 1958

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VOL'KENSHTEYN, M.V.

PHASE I BOOK EXPLOITATION SOV/5035

Vsesoyuznoye soveshchaniye po steklobraznomu sostoyaniyu. 3d, Leningrad, 1959.

Steklobraznoye sostoyaniye; trudy Tret'yego vsesoyuznogo soveshchaniya Leningrad, 16-20 noyabrya 1959 (Vitreous State; Transactions of the Third All-Union Conference on the Vitreous State, Held in Leningrad on November 16-20, 1959) Moscow, Izd-vo AN SSSR, 1960. 534 p. Errata slip inserted. 3,200 copies printed. (Series: Its: Trudy)

Sponsoring Agencies: Institut khimii silikatov Akademii nauk SSSR. Vsesoyuznoye khimicheskoye obshchestvo imeni D.I. Mendeleyeva and Gosudarstvennyy ordena Lenina opticheskiy institut imeni S.I. Vavilova.

Editorial Board: A.I. Avgustinik, V.P. Barzakovskiy, M.A. Bezborodov, O.K. Botvinkin, V.V.Vargin, A.G. Vlasov, K.S. Yevstrop'yev, A.A. Lebedev, M.A. Matveyev, V.S. Molchanov, R.L. Myuller, Ye.A. Poray-Koshits, Chairman, N.A. Toropov, V.A. Florinskaya, A.K. Yakhkind; Ed. of Publishing House: I.V. Suvorov; Tech. Ed.: V.T. Bochover.

PURPOSE: This book is intended for researchers in the science and technology of glasses.

COVERAGE: The book contains the reports and discussions of the Third All-Union Conference on the Vitreous State, held in Leningrad on November 16-19, 1959. They deal with the methods and results of studying the structure of glasses, the relation between the structure and properties of glasses, the nature of the chemical bond and glass structure, and the crystallochemistry of glass. Fused silica, mechanism of vitrification, optical properties and glass structure, and the electrical properties of glasses are also discussed. A number of the reports deal with the dependence of glass properties on composition, the tinting of glasses and radiation effects, and mechanical, technical, and chemical properties of glasses. Other papers treat glass semiconductors and soda borosilicate glasses. The Conference was attended by more than 300 delegates from Soviet and East German scientific organizations. Among the participants in the discussions were N.V. Solomin, Ye. V. Kuvshinskiy, Yu.A. Gastev, V.P. Pryanishnikov, Yu. Ya. Gotlib, O.P. Mchedlov-Petrosyan, G.P. Mikhaylov, S.M. Petrov, A.N. Lazarev, D.I. Levin, A.V. Shatilov, N.T. Ploshchinskiy, A.Ya. Kuznetsov, E.V. Degtyareva, G.V. Byurganovskaya, A.A. Kalenov, M.M. Skornyakov, P.Ya. Bokin, E.K. Keller, Ya.A. Kuznetsov, V.P. Pozdnev, R.S. Shevelevich, Z.G. Pinsker, and O.S. Molchanova. The final session of the Conference was addressed by Professor I.I. Kitaygorodskiy, Honored Scientist and Engineer, Doctor of Technical Sciences. The following institutes were cited for their contribution to the development of glass science and technology: Gosudarstvennyy opticheskiy institut (State Optical Institute), Institut khimii silikatov AN SSSR (Institute of Silicate Chemistry, AS USSR), Fizicheskiy institut AN SSSR (Physics Institute AS USSR), Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute AS USSR), Institut fiziki AN BSSR, Minsk (Institute of Physics, Academy of Sciences, Belorusskaya SSR, Minsk), Laboratory of Physical Chemistry of Silicates of the Institut obshchey i neorganicheskoy khimii AN BSSR, Minsk (Institute of General and Inorganic Chemistry, Academy of Sciences, Belorusskaya SSR, Minsk), Institut vysokomolekulyarnykh soyedineniy AN SSSR (Institute of High Molecular Compounds, AS USSR), Gosudarstvennyy institut stekla (State Institute for Glass), Gosudarstvennyy institut steklovolokna (State Institute for Glass Fibers), Gosudarstvennyy institut elektrotekhnicheskogo stekla (State Institute for Electrical Glass), Sibirskiy fiziko-tekhnicheskiy institut, Tomsk (Siberian Physicotechnical Institute, Tomsk), Leningradskiy gosudarstvennyy universitet (Leningrad State University), Moskovskiy khimiko-tekhnologicheskiy institut (Moscow Institute of Chemical Technology), Leningradskiy tekhnologicheskiy institut im. Lensoveta (Leningrad Technological Institute imeni Lensovet), Belorusskiy politekhnicheskiy institut Minsk (Belorussian Polytechnic Institute, Minsk), Novocherkasskiy politekhnicheskiy institut (Novocherkassk Polytechnic Institute), and Sverdlovskiy politekhnicheskiy institut (Sverdlovsk Polytechnic Institute). The Conference was sponsored by the Institute of Silicate Chemistry AS USSR (Acting Director - A.S. Gotlib), the Vsesoyuznoye khimicheskoye obshchestvo im. D.I. Mendeleyeva (All-Union Chemical Society imeni D.I. Mendeleyev), and the Gosudarstvennyy ordena Lenina opticheskiy institut imeni S.I. Vavilova (State "Order of Lenin" Optical Institute imeni S.I. Vavilov). The 15 resolutions of the Conference include recommendations to organize a Center for the purpose of coordinating the research on glass, to publish a new periodical under the title "Fizika i khimiya stekla" (Physics and Chemistry of Glass), and to join the International Committee on Glass. The Conference thanks A.A. Lebedev, Academician, Professor, and Chairman of the Organization Committee; Ye.A. Poray-Koshits, Doctor of Physics and Mathematics, Member of the Organizational Committee; and R.L. Myuller, Doctor of Chemical Sciences, Member of the Organizational Committee. The editorial board thanks G.M. Bartenev, M.V. Vol'kenshteyn, L.I. Demkina, D.P. Dobychin, S.K. Dubrovo, V.A. Ioffe, and B.T. Kolomiyets. References accompany individual reports.

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Relation Between the Structure and Properties of Glasses

Nature of the Chemical Bond and Structure of Glasses

"Crystallochemistry of Glass"

FUSED SILICA. MECHANISM OF VITRIFICATION

Fused Silica

Mechanism of Vitrification

VOL'KENSHTEYN, M.V., red.; TELESNIN, N.L., red.; BELEVA, M.A., tekhn.red.

[Physics of polymers; collected articles] Fizika polimerov; sbornik statei. Moskva, Izd-vo inostr.lit-ry, 1960. 551 p. (MIRA 13:8)
(Polymers)

S/829/60/000/000/001/005
D243/D308

AUTHOR: Vol'kenshteyn, M.V.

TITLE: Large molecules and biology

SOURCE: Fiziko-khimicheskiye i strukturnyye osnovy biologicheskikh yavleniy : sbornik rabot. Inst. biol. fiz. AN SSSR. Moscow, Izd-vo AN SSSR, 1960, 7-11

TEXT: The author considers some distinctive features of the large molecules important in the structure of living organisms. He discusses their great individuality, taking plasma albumens and nucleic acids as an example, and the role of stereoisomeric atomic groups; the work of Orekhovich's school is referred to. Considering these substances as polyelectrolytes, the consequent relation between mechanical work and pH of the medium, and the indivisibility of physico-mechanical and chemical processes are discussed. Their role as information carriers and transmitters is described and suggestions are made for breaking the DNA code. Here some of Gamov's work is criticized on the basis of ignoring the chemical interaction

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S/829/60/000/000/001/005
D243/D308

Large molecules and biology

between nucleic acids and albumens. Finally, these substances are briefly considered at the above-molecular level, with particular reference to their properties in the crystalline state.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad (Institute of High Molecular Compounds, AS USSR, Leningrad)

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VOL'KENSHTEYN, M.V.

SOV/4982

International symposium on macromolecular chemistry, Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii SSSR, Moskva, 14-18 iyunya 1960 g.; doklady i avtoreferaty. Sektsiya I. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-18, 1960; Papers and Summaries. Section I.) [Moscow, Izd-vo AN SSSR, 1960] 346 p. 5,500 copies printed.

Sponsoring Agency: The International Union of Pure and Applied Chemistry, Commission on Macromolecular Chemistry

Tech. Ed.: T. V. Polyakova.

PURPOSE: This collection of articles is intended for chemists and researchers interested in macromolecular chemistry.

COVERAGE: This is Section I of a multivolume work containing scientific papers on macromolecular chemistry in Moscow. The material includes data on the synthesis and properties of polymers, and on the processes of polymerization, copolymerization, polycondensation, and polyrecombination. Each text is presented in full or summarized in French, English, and Russian. There are 47 papers, 28 of which were presented by Soviet, Rumanian, Hungarian, and Czechoslovakian scientists. No personalities are mentioned. References accompany individual articles.

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S/081/61/000/009/013/015
B101/B205

5.3100

AUTHORS: Anufriyeva, Ye. V., Vol'kenshteyn, M. V.

TITLE: Luminescence method of investigating the vitrification of polymers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1961, 637, abstract 9P31 (9R31)(V sb. "Stekloobrazn. sostoyaniye", M.-L., AN SSSR, 1960, 138-142, Diskus., 153-154)

TEXT: The authors studied the effect of the vitrification of polymers on the intensity of fluorescence of molecules with a non-rigid structure, which had been introduced into the polymer (auramine, crystal violet, Michler's ketone) in polyvinyl acetate, polyvinyl alcohol, and other media between 20 and 100°C. All curves obtained show a break for $T = T_v$. If T is greater than T_v, the local viscosity of the medium changes accordingly to such an extent that a mutual rotation of the parts of the luminescing molecule and a quenching of luminescence become possible. The (I)T curves of auramine in polyvinyl alcohol show a further break

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Luminescence method of ...

at 55°C, which is caused by hydrogen bonds. When investigating the system polymer - luminescing molecule with a rigid structure, a break is observable only with a certain choice of the system. When investigating the polarization and the "retarded" phosphorescence of rhoduline orange in polyvinyl alcohol, a break appears only in the latter case. Investigations of this kind give new and essential information about the mobility of macromolecules with which luminescing molecules are connected. [Abstracter's note: Complete translation.]

S/051/60/009/004/008/034
E201/E191

AUTHORS: Vol'kenshteyn, M.V., and Kruchek, M.P.

TITLE: Calculation of the Optical Activity of Molecules

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, No 4, pp 467-471

TEXT: A theoretical calculation of the optical activity is illustrated in the case of 3-methylcyclopentanone. The calculation was a quantum-mechanical one and it showed that polarization interactions of constituent groups played the major role in the optical activity of molecules of 3-methylcyclopentanone type which contained one chromoform group and had no conjugated bonds. The paper is entirely theoretical. There are 2 figures and 13 references: 4 Soviet and 9 English.

SUBMITTED: February 5, 1960

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S/030/60/000/012/001/018
B004/B056

AUTHOR: Vol'kenshteyn, M. V., Doctor of Physical and Mathematical Sciences

TITLE: The Physics of Polymers

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, 30, No. 12, pp. 3 - 10

TEXT: The author gives a survey of the physical properties of polymers as linear atomic systems and of the methods and theories necessary for their investigation. The considerable achievements of Soviet research workers in this field are stressed. In this connection, reference is made to the work done by the Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR (Institute of Macromolecular Compounds of the Academy of Sciences USSR) (V. N. Tsvetkov et al.). The variety of the possible rotation-isomeric configurations of polymers led the collaborators of this Institute to develop a statistical theory on configuration, on the basis of which they calculated the dimensions of macromolecules, their electrical and optical properties by using modern physical methods such as measurement of light scatter, measurement of the birefringence in flow etc.

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The Physics of Polymers

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Whereas the configuration statistics for elastic polymers (natural rubber, polyisobutylene) is already well developed (S. Ye. Bresler, Ya. I. Frenkel'), there exists as yet no theory for relatively hard macromolecules, for such as form intra- and intermolecular hydrogen bridges, as well as for polyelectrolytes. In the case of rubber, the rotational isomerism could be proved to exist by means of polarized infra-red spectra. The investigation of the kinetic behavior of the polymers (A. P. Aleksandrov, Yu. S. Lazurkin), such as relaxation, dielectric losses (G. P. Mikhaylov), mobility of macromolecules and their links, are now investigated by means of ultrasonics and magnetic resonance. In spite of voluminous material, a clarification of the nature of the relaxation spectrum (V. A. Kargin, G. L. Slonimskiy) of macromolecules in interaction has at yet not been successfully carried out. The mathematical formulation of the vitrification temperature (P. P. Kobeko, Ye. V. Kuvshinskiy, S. N. Zhurkov) has hitherto shown only a qualitative agreement with the experiment. The existence of crystalline and amorphous regions in polymers is mentioned, and the molecular packets are pointed out as a preliminary stage of crystallization (V. A. Kargin, A. I. Kitaygorodskiy, G. L. Slonimskiy). In this case, the application of the general principles

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The Physics of Polymers S/030/60/000/[illegible] B004/B056

of solid state physics, especially of the dislocation theory is promising. The application of the chain-method according to Markov permits the thermodynamic analysis of reduplication of desoxyribonucleic acid, upon which mitosis is based. The polyelectrolytic nature of albumin and the muscular contraction basing on it has been proven by V. A. Engel'gardt and M. N. Lyubimova. The physics of polymers thus becomes the basis of the further development of biology. As regards the electrical and magnetic properties of polymers, papers by A. V. Topchiyev, V. A. Kargin, B. A. Krentsel', and L. S. Polak are pointed out, who obtained substances of high conductivity from thermally treated polyacrylonitrile, which have semiconductor properties. Electrical properties are found also in the polyphenylenes obtained by A. A. Berlin. L. A. Blyumenfel'd found a high unpaired electron content in desoxyribonucleic acid and its albumin compounds. Together with V. L. Ginzburg, he developed the theory of an ionic state of the desoxyribonucleic acid chains. Problems of adsorption, adhesion and polymerization are not discussed in the present paper, because they are rather to be ascribed to physical chemistry than to physics. There are 16 Soviet references.

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VOLKENSHTEYN, M. V. (USSR)

"Co-operative Precesses and the Reduplication of Deoxyribonucleic Acid."

Report presented at the 5th International Biochemistry Congress, Moscow, 10-16 Aug 1961

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510019-0"

VOLKENSHTEYN, M. V., GODZHAYEV, N. M., GOTLIB, YU. YA., YELYASHEVICH A. M., PTITSIN, S. B., and BIRSHTEYN, G. M. (USSR)

"Statistic Thermodynamic and Kinetic Model Theory of Biosynthesis."

Report presented at the 5th International Biochemistry Congress, Moscow, 10-16 Aug 1961

VOL'KENSHTEYN, M.V.; GODZHAYEV, N.M.; GOTLIB, Yu.Ya.; PTITSYN, O.B.

Kinetics of the reduplication of desoxyribonucleic acid. Uch. zap. AGU. Ser. fiz.-mat. i khim. nauk no.4:105-112 '61. (MIRA 16:6)
(Nucleic acids)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510019-0"

VOL'KENSHTEYN, M.V.; KRUCHEK, M.P.

Optical activity of amino acids. Zhur. strukt. khim. 2 no. 1:59-62 Ja-F '61. (MIRA 14:2)

1. Leningradskiy pedagogicheskiy institut im. A.I. Gertsena.
(Amino acids--Optical properties)

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S/192/61/002/003/001/001
D257/D305

5.3100

AUTHORS: Borisova, N.P. and Vol'kenshteyn, M.V.

TITLE: Van der Waals forces between hydrocarbon molecules

PERIODICAL: Zhurnal strukturnoy khimii, v. 2, no. 3, 1961, 346-349

TEXT: This article deals with the van der Waals "interaction energy" or so-called van der Waals "potential energy" between molecules of methane. The results found in the literature for potential energy between two non-bonded hydrogen atoms - H...H were represented in Fig. 1. where potentials energies - "U" in Kcal/mol were plotted against the corresponding inter-nuclear distances - "r" in Å. [Abstractor's note: In this article two-non-bonded hydrogen atoms are represented as follows: H...H, and analogously two non-bonded carbon atoms - C...C, two hydrogen molecules - - $H_2...H_2$, two methane molecules - $CH_4...CH_4$ etc.] Curve 2 in Fig. 1 is the experimental curve found from potential energy between two hydrogen molecules. Curve 1, Curve 3 and Curve 4 in Fig. 1 represent the potential

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energy between H_2-H_2 i.e. the potential energy between non-bonded hydrogen atoms which have a bond with an atom of H (i.e. between H - H...H - H) calculated by various equations derived independently. The potential for -C-H...H-C- represented by curve 5 in the range $2.2 < r < 3.0$ Å is negative, i.e. it represents the forces of attraction while the potential for H-H...H-H represented by curves 1, 3 and 4 in the above mentioned range of "r" is positive, i.e. it represents forces of repulsion. It can be assumed that C bonded with H causes the deformation of the electronic shell of hydrogen atom, leading to the decrease of repulsive forces between hydrocarbon molecules. The carbon atom in a methane molecule is not completely shielded by the four hydrogen atoms and, therefore, the calculation of potential energy between methane molecules does not reduce to the calculation of the potential energy between non-bonded hydrogen atoms; the potential energy between two carbon atoms C...C as well as the potential energy between hydrogen atom of one molecule and carbon atom of the other molecule H...C should be considered. The potential energy

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Van der Waals...

between two non-bonded carbon atoms was found by A.I. Kitaygorodskiy:

$$U_{C-C}(r, \text{Å}) = 37 \cdot 10^3 \quad e^{-3.6r} - \frac{330}{r^6} \qquad (4)$$

The potential energy for C...C plotted against internuclear distances "r" is represented in Fig. 3, [Abstractor's note: no more explanation referring to the potential for C...C could be found in this article]. Eq. (7) for the potential energy between C...H is then given:

$$U_{C...H}(r, \text{Å}) = 36 \cdot 10^3 \exp(-4.6\, r) - 80\, r^{-6} \qquad (7)$$

[Abstractor's note: No further explanation referring to the potential for C...H could be found in this article.] When calculating the potential energy between methane molecules, their relative spatial orientations of one molecule in respect to the other should be taken into consideration. One methane molecule can have different spatial orientations in respect to the other. Total potential between methane molecules is the sum of three potential energies namely: the potential between non-bonded hydrogen atoms H...H, the potential between non-bonded carbon atoms - C...C and the potential

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between non-bonded carbon and hydrogen atoms - C...H. As the potential energy depends on the distance between atoms, each of the three above mentioned potential energies are different for the different relative spatial orientations of methane molecules. The potential energy H...H is pronounced mostly in the "a" relative orientations of molecules, the potential energy C...C is pronounced mostly in the "δ" orientations of molecules and the potential energy C...H is pronounced mostly in the "B" orientations of molecules. Eq. (3) used for calculating potential energy between non-bonded hydrogen atoms was derived for the calculation of potential energy between hydrogen molecules. The assumption that it can be applicable for hydrocarbons is, therefore, wrong.

$$U(r, \mathring{A}) = 12 \cdot 10^2 \exp(-2,85\,r) - \frac{160}{r^6} \quad (3)$$

Eq. (3) was derived assuming that the potential energy between hydrogen molecules is equal to the sume of 1/4 the potential for two hydrogen atoms in the single state and 3/4 the potential for two hydrogen atoms in triplet form:

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$$U_{H...H} = \frac{1}{4} U_{1\xi} + \frac{3}{4} U_{3\xi} \quad (2)$$

[Abstractor's note: Eq. (3) was not derived and no more explanation referring to it could be found in this article]. Taking into account the equations for calculating potential energy between methane molecules, the potential energy between non-bonded hydrogen atoms in methane molecule $H_3C - CH_3$ was calculated to be equal -0.2 Kcal/mol which represents attraction and was found to be practically independent of the rotational angle of the CH_3-group around the C - C bond. There are 5 figures and 14 references: 1 Soviet-bloc and 13 non-Soviet-bloc. The references to the 4 most recent English language references read as follows: C.A. Coulson, D. Stocker, Mol. Phys. 2, 397 (1959), K. Howlett, J. Chem. Soc., 4353 (1957), L. Pauling, Proc. Nat. Acad. Sci. USA, 44, 211 (1958), G. Harris, F. Harris, J. Chem. Phys., 31, 1450 (1959).

ASSOCIATION: Institut vysokomolekulyarnykh soyedinyeniy AN SSSR Leningrad (Institute of High Molecular Compounds, AS USSR, Leningrad)

SUBMITTED: July 4, 1960

(For Figs. 1, and 3 see next card)

BORISOVA, N.P.; VOL'KENSHTEYN, M.V.

Internal rotation in propane and n-butane. Zhur.strukt.khim. 2 no.4:469-475 Jl-Ag '61. (MIRA 14:9)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
(Propane) (Butane) (Molecular rotation)

BAZHENOV, N.M.; VOL'KENSHTEYN, M.V.; KOL'TSOV, A.I.; KHACHATUROV, A.S.

Nuclear magnetic resonance study of polymers. Part 1: Temperature dependence of molecular mobility in different stereoisomeric forms of poly(methyl methacrylate). Vysokom. soed. 3 no.2:290-291 F '61.
(MIRA 14:5)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Methacrylic acid)
(Nuclear magnetic resonance)

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B102/B204

AUTHORS: Vol'kenshteyn, M. V., Gotlib, Yu. Ya., and Ptitsyn, O. B.

TITLE: The kinetics of cooperative processes

PERIODICAL: Fizika tverdogo tela, v. 3, no. 2, 1961, 420-428

TEXT: The solution of the kinetic equations describing the cooperative processes occurring in changes of state (e.g. in fluids) is connected with considerable mathematic difficulties, if the state parameters change continuously with the coordinates and the momenta of the interacting particles. However, it is mostly sufficient to investigate two or more discrete values of the parameters of state, which simplifies calculations considerably. The authors now developed a method permitting solution of the kinetic equations for cooperative systems by means of discrete state parameters by successive approximations. The interrelation between this method and others (e.g. as developed by N. N. Bogolyubov) is discussed; the present method is suited for studying cooperative kinetic processes of the structural change in liquids and solids. Such chemical processes are considered to be cooperative as occur on a certain matrix; in

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heterogeneous catalysis, e.g. the catalyst plays the role of such a matrix. The synthesis of albumens and nucleic acids, e.g. occurs only on matrices with the participation of ferments. It may be assumed that in biosynthesis, the cooperative processes play the main part. Here a system is investigated which consists of N correlated subsystems; the probability of the change of a state of a subsystem is assumed to depend not only on its state but also on the state of the neighboring subsystems. Thus, the probability of a change in state (transition), depends only on states and not on the transition of the neighboring subsystems, so that only a single transition need be investigated. For the state distribution function $F(\alpha_1, \alpha_2, \dots \alpha_N) = F\{\alpha\}$ the kinetic equation

$$\frac{dF\{\alpha\}}{dt} = -F\{\alpha\}\sum_j \sum_{\alpha'_j \neq \alpha_j} w_{\alpha_j \to \alpha'_j}(\{\alpha\}, \alpha'_j) + \sum_j \sum_{\alpha'_j \neq \alpha_j} F(\alpha_1, \alpha_2, \dots \alpha_{j-1}, \alpha'_j, \alpha_{j+1}, \dots \alpha_N)\, w_{\alpha'_j \to \alpha_j}(\{\alpha\}, \alpha'_j), \qquad (1)$$

holds, where w denote the transition probabilities. The partial distribution functions of n-th order, which depend on the state n of the subsystem are introduced with

$$F^{(n)}(\alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_n}) = \sum_{\substack{\alpha_k \\ (k \neq i_1, i_2, \dots i_n)}} \cdots \sum F(\alpha). \qquad (2)$$

and finally one obtains for the partial distribution functions

$$\frac{dF^{(1)}(\alpha_i)}{dt} = - \sum_{\alpha_{i_1} \dots \alpha_{i_s}} F^{(s+1)}(\alpha_i, \alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_s}) \times$$
$$\times \sum_{\alpha_i'} w_{\alpha_i \to \alpha_i'}(\alpha_i, \alpha_i', \alpha_{i_1}, \dots \alpha_{i_s}) + \sum_{\alpha_{i_1} \dots \alpha_{i_s}} \sum_{\alpha_i'}$$
$$F^{(s+1)}(\alpha_i', \alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_s}) w_{\alpha_i' \to \alpha_i}(\alpha_i', \alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}), \qquad (3)$$

$$\underset{(k = 1, 2, \dots z)}{\frac{dF^{(2)}(\alpha_i, \alpha_k)}{dt}} = - \sum_{\alpha_{i_1} \dots \alpha_{i_{k-1}}, \alpha_{i_{k+1}} \dots \alpha_{i_s}} F^{(s+1)}(\alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}) \times$$
$$\times \sum_{\alpha_i'} w_{\alpha_i \to \alpha_i'}(\alpha_i, \alpha_i', \alpha_{i_1}, \dots \alpha_{i_s}) - \sum_{\alpha_{i_1} \dots \alpha_{i_{k-1}}, \alpha_{i_{k+1}}, \alpha_{i_s}, \alpha_{j_1} \dots \alpha_{j_l}}$$

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$$F^{(s+l_k+1)}(\alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}, \alpha_{j_1}, \dots \alpha_{j_l}) \sum_{\alpha'_{i_k}} w_{\alpha_{i_k} \to \alpha'_{i_k}} (\alpha_{i_k}, \alpha'_{i_k}, \alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}, \alpha_{j_1}, \dots \alpha_{j_l}) + \sum_{\alpha_{i_1}, \dots \alpha_{i_{k-1}} \alpha_{i_{k+1}}, \dots \alpha_{i_s}} \sum_{\alpha'_i} F^{(s+1)}(\alpha'_i, \alpha_{i_1}, \dots \alpha_{i_s}) \times$$

$$\times w_{\alpha'_i \to \alpha_i} (\alpha'_i, \alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}) + \sum_{\alpha_{i_1}, \dots \alpha_{i_{k-1}}, \alpha_{i_{k+1}}, \alpha_{i_s}, \alpha_{j_1}, \dots \alpha_{j_l}} \sum_{\alpha'_{i_k}}$$

$$F^{(s+l_k+1)}(\alpha_i, \alpha_{i_1}, \dots \alpha_{i_{k-1}}, \alpha'_{i_k}, \alpha_{i_{k+1}}, \dots \alpha_{i_s}, \alpha_{j_1}, \dots \alpha_{j_l}) \times$$

$$\times w_{\alpha'_{i_k} \to \alpha_{i_k}} (\alpha'_{i_k}, \alpha_{i_k}, \alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}, \alpha_{j_1}, \dots \alpha_{j_l})$$

$$\frac{dF^{(s+1)}(\alpha_i, \alpha_{i_1}, \dots \alpha_{i_s})}{dt} = -F^{(s+1)}(\alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}) \times \quad (4)$$

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$$
\begin{aligned}
&\times \sum_{\alpha_i'} w_{\alpha_i \to \alpha_i'}(\alpha_i, \alpha_i', \alpha_{i_1}, \ldots \alpha_{i_s}) - \sum_{k=1}^{s} \sum_{\alpha_{j_1}, \ldots \alpha_{j_l}} F^{(s+l_k+1)}(\alpha_i, \alpha_{i_1}, \\
&\quad \ldots \alpha_{i_s}, \alpha_{j_1}, \ldots \alpha_{j_l}) \sum_{\alpha_{i_k}'} w_{\alpha_{i_k} \to \alpha_{i_k}'}(\alpha_{i_k}, \alpha_{i_k}', \alpha_i, \alpha_{i_1}, \ldots \alpha_{i_s}, \\
&\alpha_{j_1}, \ldots \alpha_{j_l}) + \sum_{\alpha_i'} F^{(s+1)}(\alpha_i', \alpha_{i_1}, \ldots \alpha_{i_s}) w_{\alpha_i' \to \alpha_i}(\alpha_i', \alpha_i, \alpha_{i_1}, \ldots \alpha_{i_s}) + \\
&\quad + \sum_{k=1}^{s} \sum_{\alpha_{j_1}, \ldots \alpha_{j_l}} \sum_{\alpha_{i_k}'} F^{(s+l_k+1)}(\alpha_i, \alpha_{i_1}, \ldots \alpha_{i_{k-1}}, \alpha_{i_k}', \alpha_{i_{k+1}}, \ldots \alpha_{i_s}, \\
&\quad \alpha_{j_1}, \ldots \alpha_{j_l}) \times w_{\alpha_{i_k}' \to \alpha_{i_k}}(\alpha_{i_k}', \alpha_{i_k}, \alpha_i, \alpha_{i_1}, \ldots \alpha_{i_s}, \alpha_{j_1}, \ldots \alpha_{j_l}).
\end{aligned} \tag{4}
$$

which may be solved according to the method of successive approximations. Here the first approximation agrees with the zero-th approximation of the Bogolyubov power expansion. In first approximation,

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$F_1^{(n)}\left(\alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_n}\right) = \prod_{k=1}^{n} F_1^{(1)}\left(\alpha_{i_k}\right)$ holds; for $F_1^{(1)}(\alpha_i)$ one obtains the system

$$\frac{dF_1^{(1)}(\alpha_i)}{dt} = -F_1^{(1)}(\alpha_i) \sum_{\alpha_{i_1},\dots\alpha_{i_s}} \prod_{k=1}^{s} F_1^{(1)}(\alpha_{i_k}) \sum_{\alpha_i'} w_{\alpha_i \to \alpha_i'}(\alpha_i, \alpha_i', \alpha_{i_1}, \dots \alpha_{i_s}) + \\ + \sum_{\alpha_i'} F_1^{(1)}(\alpha_i') \sum_{\alpha_{i_1},\dots\alpha_{i_s}} \prod_{k=1}^{s} F_1^{(1)}(\alpha_{i_k}) w_{\alpha_i' \to \alpha_i}(\alpha_i', \alpha_i, \alpha_{i_1}, \dots \alpha_{i_s}). \qquad (6)$$

From the equivalence of all subsystems one obtains as normalization condition $\sum_{p=1}^{f} F^{(1)}(\alpha_i^{(p)}) = 1$, independent of i. (6) supplies the function $F^{(1)}(\alpha)$ in first approximation; in order to obtain this function in second approximation, it is necessary to substitute

function $F^{(z+1_k+1)}$ in first approximation into the last equation of (4), whose solution gives $F^{(z+1)}$ in second approximation. If then $F_2^{(z+1)}$ is substituted into (3),

$$\frac{dF^{(1)}(\alpha_i)}{dt} = -\sum_{\alpha_{i_1},\dots\alpha_{i_z}} F^{(z+1)}(\alpha_i, \alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_z}) \times$$
$$\times \sum_{\alpha_i'} w_{\alpha_i \to \alpha_i'}(\alpha_i, \alpha_i', \alpha_{i_1}, \dots \alpha_{i_z}) +$$
$$+ \sum_{\alpha_{i_1},\dots,\alpha_{i_z}} \sum_{\alpha_i'} F^{(z+1)}(\alpha_i', \alpha_{i_1}, \alpha_{i_2}, \dots \alpha_{i_z}) w_{\alpha_i' \to \alpha_i}(\alpha_i', \alpha_i, \alpha_{i_1}, \dots \alpha_{i_z}) -$$
$$- \sum_{\alpha_k, k \neq i} \sum_{j \neq i} F(\alpha) \sum_{\alpha_j'} w_{\alpha_j \to \alpha_j'}(\alpha_j, \alpha_j', \alpha_{j_1}, \dots \alpha_{j_z}) +$$
$$+ \sum_{\alpha_k, k \neq i} \sum_{j \neq i} \sum_{\alpha_j'} F(\alpha_1, \alpha_2, \dots \alpha_{j-1}, \alpha_j', \alpha_{j+1}, \dots \alpha_N) \times \quad (3)$$
$$\times w_{\alpha_j' \to \alpha_j}(\alpha_j', \alpha_j, \alpha_{j_1}, \dots \alpha_{j_z}), \quad (3)$$

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one obtains $F^{(1)}(\alpha)$ in second approximation. In order to obtain $F^{(1)}(\alpha)$ in third approximation, it is necessary to know $F_2^{(z+1_k+1)}$ etc. This method is explained on the basis of the example of a linear cooperative system (e.g. macromolecule). The equations (10) - (12) are obtained, by means of which the distribution functions of arbitrary order may be determined.

$$\frac{dF^{(1)}(\alpha_i)}{dt} = -\sum_{\alpha_{i-1},\alpha_{i+1}} F^{(3)}(\alpha_{i-1},\alpha_i,\alpha_{i+1})\, w_{\alpha_i\to\alpha_i'}(\alpha_{i-1},\alpha_i,\alpha_i',\alpha_{i+1}) + \sum_{\alpha_{i-1},\alpha_{i+1}} F^{(3)}(\alpha_{i-1},\alpha_i',\alpha_{i+1})\, w_{\alpha_i'\to\alpha_i}(\alpha_{i-1},\alpha_i',\alpha_i,\alpha_{i+1}). \quad (10)$$

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$$\frac{dF^{(2)}(\alpha_i, \alpha_{i+1})}{dt} = -\sum_{\alpha_{i-1}} F^{(3)}(\alpha_{i-1}, \alpha_i, \alpha_{i+1}) w_{\alpha_i \to \alpha_i'}(\alpha_{i-1}, \alpha_i, \alpha_i', \alpha_{i+1}) -$$
$$- \sum_{\alpha_{i+2}} F^{(3)}(\alpha_i, \alpha_{i+1}, \alpha_{i+2}) w_{\alpha_{i+1} \to \alpha_{i+1}'}(\alpha_i, \alpha_{i+1}, \alpha_{i+1}', \alpha_{i+2}) +$$
$$+ \sum_{\alpha_{i-1}} F^{(3)}(\alpha_{i-1}, \alpha_i', \alpha_{i+1}) w_{\alpha_i' \to \alpha_i}(\alpha_{i-1}, \alpha_i', \alpha_i, \alpha_{i+1}) +$$
$$+ \sum_{\alpha_{i+2}} F^{(3)}(\alpha_i, \alpha_{i+1}', \alpha_{i+2}) w_{\alpha_{i+1}' \to \alpha_{i+1}}(\alpha_i, \alpha_{i+1}', \alpha_{i+1}, \alpha_{i+2}) \quad (11)$$

и при $n \geqq 3$

$$\frac{dF^{(n)}(\alpha_i, \alpha_{i+1}, \dots \alpha_{i+n-1})}{dt} = -F^{(n)}(\alpha_i, \alpha_{i+1}, \dots \alpha_{i+n-1}) \quad 1)$$
$$\sum_{p=1}^{n-2} w_{\alpha_{i+p} \to \alpha_{i+p}'}(\alpha_{i+p-1}, \alpha_{i+p}, \alpha_{i+p}', \alpha_{i+p+1}) -$$
$$- \sum_{\alpha_{i-1}} F^{(n+1)}(\alpha_{i-1}, \alpha_i, \alpha_{i+1}, \dots \alpha_{i+n-1}) w_{\alpha_i \to \alpha_i'}(\alpha_{i-1}, \alpha_i, \alpha_i', \alpha_{i+1}) -$$
$$- \sum_{\alpha_{i+n}} F^{(n+1)}(\alpha_i, \alpha_{i+1}, \dots \alpha_{i+n-1}, \alpha_{i+n}) w_{\alpha_{i+n-1} \to \alpha_{i+n-1}'}(\alpha_{i+n-2}, \alpha_{i+n-1},$$

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$$\alpha'_{i+n-1}, \alpha_{i+n}) + \sum_{p=1}^{n-2} F^{(n)}(\alpha_i, \alpha_{i+1}, \dots \alpha_{i+p-1}, \alpha'_{i+p}, \alpha_{i+p+1}, \dots, \alpha_{i+n-1}) \times$$

$$\times w_{\alpha'_{i+p} \to \alpha_{i+p}}(\alpha_{i+p-1}, \alpha'_{i+p}, \alpha_{i+p}, \alpha_{i+p+1}) + \sum_{\alpha_{i-1}} F^{(n+1)}(\alpha_{i-1}, \alpha'_i, \alpha_{i+1},$$

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$$\dots \alpha_{i+n-1}) w_{\alpha'_i \to \alpha_i}(\alpha_{i-1}, \alpha'_i, \alpha_i, \alpha_{i+1}) +$$

$$+ \sum_{\alpha_{i+n}} F^{(n+1)}(\alpha_i, \alpha_{i+1}, \dots \alpha'_{i+n-1}, \alpha_{i+n}) \times$$

$$\times w_{\alpha'_{i+n-1} \to \alpha_{i+n-1}}(\alpha_{i+n-2}, \alpha'_{i+n-1}, \alpha_{i+n-1}, \alpha_{i+n}). \qquad (12)$$

The kinetics of cooperative ... S/181/61/003/002/016/050
B102/B204

The scheme of successive approximations is represented in Fig. 1. The first and second approximations are calculated. There are 2 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR Leningrad (Institute of High-molecular Compounds AS USSR, Leningrad)

SUBMITTED: May 4, 1960

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29743
S/190/61/003/011/015/016
B110/B147

15.8520

AUTHORS: Vol'kenshteyn, M. V., Sharonov, Yu. A.

TITLE: Effect of fritting of polymer glasses on the course of specific heat in the softening range

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 11, 1961, 1739-1745

TEXT: Aim of the present work was to obtain exact quantitative data on the dynamics of vitrification and softening processes, and to investigate the effect of fritting on the softening of glass. Changes of the amorphous structure and increase of the interaction of the kinetic units take place during prolonged fritting. The irregular specific heats were measured. S. N. Zhurkov and B. Ya. Levin (Ref. 13: Sb. rabot, posvyashchennyy 70-letiyu akad. A. F. Ioffe (Collection of papers dedicated to the 70th anniversary of Academician A. F. Ioffe), Izd. AN SSSR, M.-L., 1950, p. 260) found that the specific heat has a maximum in the softening range, the position and height of which depend on the heating rate. The fritting of samples should additionally be taken into

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consideration. In order to measure the heat effects linked with the rate of relaxation, concentrated polymer solution was applied to three copper wires. A 0.14 mm wire of 98 mm length served for heating, the other 0.05 mm wires of ~17 mm length each for temperature measurements and for producing adiabatic conditions. A strip of a 0.15 to 0.20 mm thick polymer layer was obtained, which was coiled up and placed into a vacuum flask. The thermal equilibrium occurred in fractions of a second at a heating rate of 0.5 degrees/min. Measurement was made at $5\cdot10^{-5}$ mm Hg. A thin, nickel-plated Al foil which was wrapped with $R_{НЭ}$ (R_{NE}) heating wire and two coils of $R_{АЭ1}$ (R_{AE1}) and $R_{АЭ2}$ (R_{AE2}) Cu wire for adiabatic conditions served for preventing heat radiation. The heating circuit of the foil contained the rheostats R_1 and R_2 (Fig. 2). Thyratron relay IV and the bridge circuit diagram I with mirror galvanometer in the diagonal bridge kept the temperature of the foil $\ngtr 0.03^{\circ}$C lower than that of the sample. The bridge consisted of the resistors $R_{АО}$ (R_{AO}) and $R_{АЭ1}$ (R_{AE1}). The photoresistor ФСК-2 (FSK-2) was the pickup for the thyratron relay. In order to keep the sample-foil temperature difference constant, the vacuum

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flask containing the apparatus was placed in an electric furnace ... colder. The rate of cooling from temperatures $> T_v$ to the fritting temperature was 0.1 degrees/min to 6 degrees/min. The third bridge circuit diagram III with the mirror galvanometer ГЗС-47 (GZS-47) in the diagonal bridge served for temperature measurement. The temperature of the sample was measured between 0 and 120°C with 0.01°C relative accuracy. The total specific heat of polymer and Cu wire was calculated according to: $C_p = 0.239\ u^2/Rt$, where u = voltage of the heating battery; R = mean resistance of the heating wire in the range of temperature measurement; t = time required for heating by 1°C. The measurement interval was 0.5°C, in the softening range 0.25°C. Dissolved and reprecipitated polyvinyl acetate (PVA) and polystyrene (PS) (molecular weight $\sim 10^6$) were investigated. Fritting took place at 21°C for 24 hr. For PVA, the curves $C_p(T)$ pass a maximum in the softening range. Amount and temperature of the maximum increase with increasing heating rate. The amount increases linearly with increasing fritting time (Fig. 4). Relaxation times are

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measured for $< T_v$ in 10 hr so that equilibrium is approximately achieved during prolonged fritting. A maximum of C_p may occur during subsequent quick heating. It is not observed when fritting does not occur. Enthalpy also depends on the fritting time. Its change was estimated according to the change of the total amount of heat which was passed to the polymer at subsequent heating from the fritting temperature to $> T_v$. Glass may reach the state with H_0 at $T_c < T_v$: (1) during cooling from $T > T_v$ to T_c at the rate q_1 and subsequent fritting at T_c; (2) during cooling at another rate $|q_2| < |q_1|$ without fritting (Fig. 6). Cooling from $T > T_v$ to 21°C at 0.2 degrees/min without fritting corresponds to cooling at 6 degrees/min with subsequent fritting for 17 hr at the same temperature (Fig. 5, Curve 3). The same results were obtained with PS. The theoretical evaluation will be made in the next study. A. V. Sidorovich and Ye. V. Kuvshinskiy (Ref. 14: Zavodsk. labor., 1959 [illegible]) obtained similar results for PS. [illegible]

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B110/B147

Effect of fritting of polymer...

11 Soviet and 3 non-Soviet. The two most recent references to English-language publications read as follows: R. Davies, G. Jones, Advances in Physics, 2, 370, 1953; G. Jones, Glass, Methuen, 1956.

ASSOCIATION: Institut vysokomolekulyarnikh soyedineniy AN SSSR (Institute of High-molecular Compounds AS USSR)

SUBMITTED: January 1, 1961

Fig. 2. Circuit diagram of the electrical part of the installation.

Fig. 4. Dependence of $C_p(T)$ of PVA on the fritting time at 21°C after cooling at a rate of 6 degrees/min.

Legend: Fritting time: (1) 17 hr; (2) 2 days; (3) 7 days; (4) without fritting; (1); (2); (3); (Δ) 0.5 degrees/min; (x) 0.9 degrees/min; (A) C_p, cal/g·degree; (B) temperature.

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VOL'KENSHTEYN, M.V.

Cooperative processes in biology. Biofizika 6 no.3:257-264 '61.
(MIRA 14:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
(BIOPHYSICS)

VOL'KENSHTEYN, M.V.; YEL'YASHEVICH, A.M.

Statistical thermodynamic theory of the reduplication of desoxyribonucleic acid (DNA). Biofizika 6 no.5:513-523 '61. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.

(NUCLEIC ACIDS)

MILEVSKAYA, I.S.; VOL'KENSHTEYN, M.V.

Determination of macroradical conformations from spectra of electron paramagnetic resonance (EPR). Opt. i spektr. 11 no.3:349-352 S '61. (MIRA 14:9)
(Paramagnetic resonance and relaxation)
(Radicals (Chemistry))

24.7600 (1035, 1163, 1142)
18.8100 1145 1043 1559

S/048/61/025/011/015/031
B104/B102

AUTHORS: Volkenshteyn, N. V., and Fedorov, G. V.

TITLE: Temperature dependence of electrical conductivity and of the Hall effect of metallic gadolinium

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1379 - 1382

TEXT: Gadolinium belongs to the transition elements with incomplete 4f shell. Due to this shell structure, exchange interaction differs from that in ferromagnetic 3d transition elements. The temperature dependence of the Hall coefficient, R_s, in the paramagnetic region differs from that in the ferromagnetic one (Fig. 1). The empirical relations $R_s = a(\sigma_{s_o}^2 - \sigma_{s_T}^2)$ (1) and $\Delta\varrho = c + b\sigma_{s_T}^2$ (2) are given. σ_{s_o} denotes the spontaneous magnetization at 0°K; σ_{s_T} is the spontaneous magnetization at temperature T, $\Delta\varrho$ is the drop in resistivity of the ferromagnetic below the Curie point. It is shown

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that the linear relationship between R_s and $\Delta\rho$ which follows from (1), actually exists in the temperature range of 78 - 270°K, and, thus, (1) is valid at low temperatures. The maximum in the temperature dependence of the ordinary Hall coefficient, R_o, is ascribed to a para-process in the saturation range. R_o in ferromagnetics differs from the Hall coefficient in non-ferromagnetic metals. The temperature dependence of R_s is the same for Gd and Ni; however, the maximum of R_s in Gd is higher than that in Ni by a factor of 20. The conclusion is drawn from the foregoing that the particular character of the electron shell of gadolinium, while not changing the character of the temperature dependence of R_s, does change the degree of dependence. It follows that the extraordinary Hall effect is determined only by the inner effective field and that its temperature dependence is related to that of the inner effective field which is determined by spontaneous magnetization. The abnormally high value of R_s and the unusual spin-orbit interaction do not contradict general concepts. There are 5 figures and 13 references: 9 Soviet and 4 non-Soviet. The three references to English-language publications read as follows:

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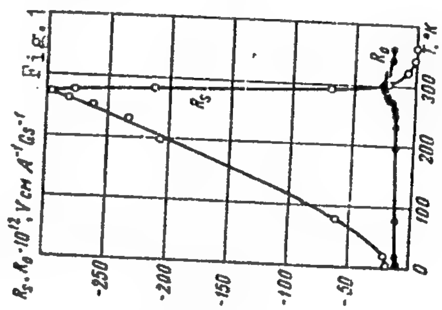
Allison F. E., Pugh E. M., Phys. Rev., 102, 1281 (1956); Karplus R., Luttinger J. M., Phys. Rev., 95, 1154 (1954); Luttinger J. M., Phys. Rev., 112, 739 (1959).

ASSOCIATION: Institut fiziki metallov Akademii nauk SSSR (Institute of Physics of Metals of the Academy of Sciences USSR)

Fig. 1. Temperature dependence of Hall coefficients R_s and R_0 in Gd.



APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510019-0"

VOL'KENSHTEYN, M.V

VOL'KENSHTEYN, M.V., [illegible]

[illegible] biopolymers. [illegible] zhizn' [illegible] ([illegible])
no. 2:2[illegible] [illegible].
(Biol[illegible]) ([illegible]molecular compounds)

VOL'KENSHTEYN, M.V.; YEL'YASHEVICH, A.M.

A contribution to the mutation theory. Dokl.AN SSSR 136 no.5: 1216-1218 F '61. (MIRA 14:5)

1. Institut vysokomolekulyarnhkh soyedineniy AN SSSR. Predstavleno akad. I.V.Obreimovym.
(Desoxyribonucleic acid) (Variation (Biology))

FRISH, S.E., otv. red.; BOBOVICH, Ya.S., kand. fiz.-matem. nauk, red.; VOL'KENSHTEYN, M.V., doktor fiz.-matem. nauk, red.: GALANIN, M.D., doktor fiz.-matem. nauk, red.; DRUKAREV, G.F., doktor fiz.-matem. nauk, red.; YEL'YASHEVICH, M.A., akademik, red.; KALITEYEVSKIY, N.I., doktor fiz.-matem. nauk, red.; KUSAKOV, M.M., doktor khim. nauk, red.; LIPIS, L.V., doktor tekhn.nauk, red.; PEKAR, S.I., doktor fiz.-matem. nauk, red.; PROKOF'YEV, V.K., doktor fiz.-matem. nauk, red.; SOKOLOV, N.D., doktor fiz.-matem. nauk, red.; FEOFILOV, P.P., doktor fiz.-matem. nauk, red.; CHULANOVSKIY, V.M., doktor fiz.-matem. nauk, red.; SHPOL'SKIY, E.V., doktor fiz.-matem. nauk, red.; YAROSLAVSKIY, N.G., kand. fiz.-matem. nauk, red.; LEKSINA, I.Ye., red. izd-va; PENKINA, N.V., red. izd-va; NOVICHKOVA, N.D., tekhn. red.; KASHINA, P.S., tekhn. red.

[Physical problems in spectroscopy]Fizicheskie problemy spektroskopii; materialy. Moskva, Izd-vo Akad. nauk SSSR. Vol.1. 1962. 474 p. (MIRA 16:2)

1. Soveshchaniye po spektroskopii. 13th, Leningrad, 1960. 2. Chlen-korrespondent Akademii nauk SSSR (for Frish). 3. Akademiya nauk Belurusskoy SSR (for Yel'yashevich).
(Spectrum analysis)

VOL'KENSHTEYN, M.V.; LEVITAN, I.O.

Optical activity and conformation of some alicyclic ketones. Zhur. strukt.khim. 3 no.1:80-86 Ja-F '62. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR i Leningradskoy gosudarstvennyy pedagogicheskiy institut imeni A.I.Gertsena. (Ketones--Optical properties)